

WHAT IS CLAIMED IS:

- 1 1. A method of log-capture replication comprising:  
2 publishing, by a first log reader, first messages to a plurality of queues, the first messages  
3 comprising changes for transactions extracted from a log by the first log reader;  
4 when one of the queues becomes unavailable, launching a second log reader to read and  
5 extract from the log, and to publish second messages comprising changes for transactions  
6 extracted from the log by the second log reader to the unavailable queue as a catch-up queue; and  
7 when the catch-up queue becomes available and the second log reader reaches the end of  
8 the log, transferring the publishing of the second messages for the catch-up queue from the  
9 second log reader to the first log reader.
- 1 2. The method of claim 1 wherein the first log reader launches the second log reader.
- 1 3. The method of claim 1 further comprising:  
2 terminating the second log reader.
- 1 4. The method of claim 1 wherein the first log reader and the second log reader execute  
2 separately.
- 1 5. The method of claim 1 wherein said transferring comprises re-synchronizing the second  
2 log reader and the first log reader.
- 1 6. The method of claim 5 wherein said re-synchronizing comprises sending synchronization  
2 messages between the first log reader and the second log reader.
- 1 7. The method of claim 6 wherein said re-synchronizing further comprises:  
2 sending a first synchronization message from the second log reader to the first log reader  
3 with second log reader restart information; and

4 if the second log reader is ahead of the first log reader in reading the log based on the  
5 second log reader restart information, sending a stop message to the second log reader.

1 8. The method of claim 6 wherein said re-synchronizing further comprises:  
2 sending a first synchronization message from the second log reader to the first log reader  
3 with second log reader restart information; and  
4 if the second log reader is behind the first log reader in reading the log based on the  
5 second log reader restart information, sending a second synchronization message from the first  
6 log reader to the second log reader, the second synchronization message comprising first log  
7 reader restart information having a first-last-queue-commit point timestamp, and suspending the  
8 publishing by the first log reader until the second log reader reaches the first-last-queue-commit  
9 point timestamp or the end of the log.

1 9. The method of claim 7 wherein said re-synchronizing further comprises:  
2 if the second log reader is behind the first log reader in reading the log based on the  
3 second log reader restart information, sending a second synchronization message from the first  
4 log reader to the second log reader, the second synchronization message comprising first log  
5 reader restart information having a first-last-queue-commit point timestamp, and suspending the  
6 publishing by the first log reader until the second log reader reaches the first-last-queue-commit  
7 point timestamp or the end of the log.

1 10. The method of claim 1 further comprising:  
2 storing first restart information, associated with the first log reader, in persistent memory;  
3 storing second restart information, associated with the second log reader, in persistent  
4 memory;  
5 stopping the first log reader and the second log reader,  
6 first launching the first log reader based on the first restart information; and  
7 second launching the second log reader based on the second restart information.

1 11. A apparatus for log-capture replication comprising:

2 a computer having a data storage device connected thereto, wherein the data storage  
3 device stores a log; and  
4 one or more computer programs, comprising a first log reader, executed by the computer,  
5 for  
6 publishing, by the first log reader, first messages to a plurality of queues, the first  
7 messages comprising changes for transactions extracted from the log by the first log  
8 reader;  
9 when one of the queues becomes unavailable, launching a second log reader to  
10 read and extract from the log and to publish second messages comprising changes for  
11 transactions extracted from the log by the second log reader to the unavailable queue as a  
12 catch-up queue; and  
13 when the catch-up queue becomes available and the second log reader reaches the  
14 end of the log, transferring the publishing of the second messages for the catch-up queue  
15 from the second log reader to the first log reader.

1 12. The apparatus of claim 11 wherein the first log reader launches the second log reader.

1 13. The apparatus of claim 11 wherein said one or more computer programs are also for  
2 terminating the second log reader.

1 14. The apparatus of claim 11 wherein the first log reader and the second log reader execute  
2 separately.

1 15. The apparatus of claim 11 wherein said transferring comprises re-synchronizing the  
2 second log reader and the first log reader.

1 16. The apparatus of claim 15 wherein said re-synchronizing comprises sending  
2 synchronization messages between the first log reader and the second log reader.

1 17. The apparatus of claim 16 wherein said re-synchronizing further comprises:  
2 sending a first synchronization message from the second log reader to the first log reader  
3 with second log reader restart information; and  
4 if the second log reader is ahead of the first log reader in reading the log based on the  
5 second log reader restart information, sending a stop message to the second log reader.

1 18. The apparatus of claim 16 wherein said re-synchronizing further comprises:  
2 sending a first synchronization message from the second log reader to the first log reader  
3 with second log reader restart information; and  
4 if the second log reader is behind the first log reader in reading the log based on the  
5 second log reader restart information, sending a second synchronization message from the first  
6 log reader to the second log reader, the second synchronization message comprising first log  
7 reader restart information having a first-last-queue-commit point timestamp, and suspending the  
8 publishing by the first log reader until the second log reader reaches the first-last-queue-commit  
9 point timestamp or the end of the log.

1 19. The apparatus of claim 17 wherein said re-synchronizing further comprises:  
2 if the second log reader is behind the first log reader in reading the log based on the  
3 second log reader restart information, sending a second synchronization message from the first  
4 log reader to the second log reader, the second synchronization message comprising first log  
5 reader restart information having a first-last-queue-commit point timestamp, and suspending the  
6 publishing by the first log reader until the second log reader reaches the first-last-queue-commit  
7 point timestamp or the end of the log.

1 20. The apparatus of claim 11 wherein said one or more computer programs is also for:  
2 storing first restart information, associated with the first log reader, in persistent memory;  
3 storing second restart information, associated with the second log reader, in persistent  
4 memory;  
5 stopping the first log reader and the second log reader,  
6 first launching the first log reader based on the first restart information; and  
7 second launching the second log reader based on the second restart information.

1 21. An article of manufacture comprising a computer program carrier readable by a computer  
2 and embodying one or more instructions executable by the computer to perform a method of log-  
3 capture replication, the method comprising:  
4 publishing, by a first log reader, first messages to a plurality of queues, the first messages  
5 comprising changes for transactions extracted from a log by the first log reader;  
6 when one of the queues becomes unavailable, launching a second log reader to read and  
7 extract from the log and to publish second messages comprising changes for transactions  
8 extracted from the log by the second log reader to the unavailable queue as a catch-up queue; and  
9 when the catch-up queue becomes available and the second log reader reaches the end of  
10 the log, transferring the publishing of the second messages for the catch-up queue from the  
11 second log reader to the first log reader.

1 22. The article of manufacture of claim 21 wherein the first log reader launches the second  
2 log reader.

1 23. The article of manufacture of claim 21 wherein the method further comprises:  
2 terminating the second log reader.

1 24. The article of manufacture of claim 21 wherein the first log reader and the second log  
2 reader execute separately.

1 25. The article of manufacture of claim 21 wherein said transferring comprises re-  
2 synchronizing the second log reader and the first log reader.

1 26. The article of manufacture of claim 25 wherein said re-synchronizing comprises sending  
2 synchronization messages between the first log reader and the second log reader.

1 27. The article of manufacture of claim 26 wherein said re-synchronizing further comprises:  
2 sending a first synchronization message from the second log reader to the first log reader  
3 with second log reader restart information; and

4           if the second log reader is ahead of the first log reader in reading the log based on the  
5 second log reader restart information, sending a stop message to the second log reader.

1   28.    The article of manufacture of claim 26 wherein said re-synchronizing further comprises:  
2           sending a first synchronization message from the second log reader to the first log reader  
3 with second log reader restart information; and  
4           if the second log reader is behind the first log reader in reading the log based on the  
5 second log reader restart information, sending a second synchronization message from the first  
6 log reader to the second log reader, said second synchronization message comprising first log  
7 reader restart information having a first-last-queue-commit point timestamp, and suspending the  
8 publishing by the first log reader until the second log reader reaches the first-last-queue-commit  
9 point timestamp or the end of the log.

1   29.    The article of manufacture of claim 27 wherein said re-synchronizing further comprises:  
2           if the second log reader is behind the first log reader in reading the log based on the  
3 second log reader restart information, sending a second synchronization message from the first  
4 log reader to the second log reader, the second synchronization message comprising first log  
5 reader restart information having a first-last-queue-commit point timestamp, and suspending the  
6 publishing by the first log reader until the second log reader reaches the first-last-queue-commit  
7 point timestamp or the end of the log.

1   30.    The article of manufacture of claim 27 wherein said method further comprises:  
2           storing first restart information, associated with the first log reader, in persistent memory;  
3           storing second restart information, associated with the second log reader, in persistent  
4 memory;  
5           stopping the first log reader and the second log reader,  
6           first launching the first log reader based on the first restart information; and  
7           second launching the second log reader based on the second restart information.